

The following listing of the claims will replace all prior versions and listings of claims in the application.

**LISTING OF THE CLAIMS:**

1. (currently amended) A method for enhancing plant growth or yield, comprising:  
treating soil with H<sub>2</sub> gas;  
(i) at a concentration at least 50 times greater than the concentration of H<sub>2</sub> in air[[,]]; and  
(ii) for a duration sufficient to increase H<sub>2</sub> uptake of the soil; and thereafter  
growing a plant in the soil;  
wherein said treating soil with H<sub>2</sub> gas enhances plant growth or yield.
2. (previously amended) The method of claim 1, further comprising combining the soil treated with H<sub>2</sub> with soil not treated with H<sub>2</sub>, and growing the plant in the thus combined soil.
3. (previously amended) The method of claim 2 wherein the amount of the combined soil which is the soil treated with H<sub>2</sub> is between about 5% and 100%, by volume.
4. (previously amended) The method of claim 1, wherein the soil treated with H<sub>2</sub> is combined with soil in which the plant is already growing.
5. (previously amended) The method of claim 1, wherein a seed or plant is planted in soil not treated with H<sub>2</sub> adjacent a volume of the soil treated with H<sub>2</sub>.
6. (cancelled).
7. (original) The method of claim 1, wherein the H<sub>2</sub> gas is generated by the electrolysis of water.
8. (original) The method of claim 7, wherein the H<sub>2</sub> gas is generated by providing an electrical current in the soil so as to generate H<sub>2</sub> directly within the soil.

9. (previously amended) The method of claim 1, wherein the H<sub>2</sub> gas is generated by microorganisms selected for their ability to evolve H<sub>2</sub>.

10. (original) The method of claim 9, wherein the H<sub>2</sub> evolving microorganisms are also N<sub>2</sub> fixing microorganisms.

11. (original) The method of claim 1, wherein the H<sub>2</sub> gas is provided by a legume selected for its ability to produce H<sub>2</sub> gas.

12. (original) The method of claim 11, wherein the legume has HUP- symbiotic nitrogen-fixing bacteria.

13. (original) The method of claim 11, wherein the legume has inefficient nitrogen-fixing bacteria.

14. (original) The method of claim 11, wherein the legume has distributed nodulation.

15. (original) The method of claim 11, wherein the legume has an enhanced number of nodules.

16. (original) The method of claim 1, further comprising placing the soil in a container that minimizes the diffusion of H<sub>2</sub> therefrom, and applying H<sub>2</sub> to the soil in the container.

17. (previously amended) The method of claim 1, further comprising covering the soil with a membrane having a low permeability to H<sub>2</sub>, and providing H<sub>2</sub> below the membrane, wherein at least a portion of the treatment of the soil with H<sub>2</sub> occurs beneath the membrane.

18. (original) The method of claim 1, wherein the H<sub>2</sub> gas is provided to the soil via tubing or hollow probes placed in the soil.

19. (currently amended) ~~The method of claim 1,~~ A method for enhancing plant growth or yield, comprising:

treating soil with H<sub>2</sub> gas:

(i) at a concentration at least 50 times greater than the concentration of H<sub>2</sub> in air; and

(ii) for a duration sufficient to increase H<sub>2</sub> uptake of the soil;  
wherein said treatment of soil with H<sub>2</sub> gas enhances the ability of soil microorganisms to oxidize H<sub>2</sub>; and  
wherein said enhanced ability of the soil microorganisms potentiates enhanced growth or yield of a plant growing in said soil after treatment with H<sub>2</sub> gas.

20. (original) The method of claim 19, further comprising:  
isolating the microorganisms, and  
applying the microorganisms to soil, seeds, or plant roots;  
wherein said application of microorganisms potentiates enhanced growth or yield of a plant.

21. (original) The method of claim 20, further comprising culturing said microorganisms and applying the microorganisms to soil, seeds, or plant roots.

22. (cancelled).

23. (cancelled).

24. (previously added) The method of claim 1, wherein the H<sub>2</sub> gas is generated by soil microorganisms.

25. (previously amended) The method of claim 1, further comprising combining the soil treated with H<sub>2</sub> with soil not treated with H<sub>2</sub>, and growing the plant in the thus combined soil, wherein the H<sub>2</sub> is generated by H<sub>2</sub> evolving microorganisms.

26. (currently amended) The method of claim 1, wherein the concentration of H<sub>2</sub> gas is ~~at least 50~~ 500 to 4000 times greater than the concentration of H<sub>2</sub> gas in air.

27. (currently amended) The method of claim ~~[[26]]~~ 1, wherein the concentration of H<sub>2</sub> gas provided is increased as treatment of soil progresses.

28. (New) The method of claim 1, wherein the duration is at least 1 week.
29. (New) The method of claim 1, wherein the duration is between 1 week and 10 weeks.